Good evening. So it's a wonderful evening again. This is Chancellor Encore David Ward. I'm here for a second time and only a second time. But it's one of the great wonderful experiences of my two year return to UW-Madison. I think writing a book and reading a book is a very lonely, almost individualistic and very personal experience. But once we start sharing our ideas about how to react to a book, it becomes a literary community. That's what this great books program is all about.

For the past two months, we've been engaged in a conversation about an extraordinary book that people on campus described as “striking” and “impossible to put down.” I feel that way about Radioactive, which is why I selected it for this year's Go Big Read program. I'm very pleased that the campus community agrees. A record number of courses, more than 90, are using the book this semester, showing the enormous trans-disciplinary community-making character of this book.

From an English course that looks at the evolution of graphic novels to introductory biology classes, faculty and students are engaging with Radioactive. We gave copies of the book to more than 5,000 new students, during Wisconsin Welcome week, to all our Freshmen in August.

I'm honored to welcome the author of Radioactive, Lauren Redniss, to our campus. Her writing and illustrations have appeared in numerous publications, including the New York Times, which nominated her work for the Pulitzer Prize. Lauren is a National Book Award finalist, the recipient of a 2012 Guggenheim Fellowship and is currently Artist in Residence at the American Museum of Natural History. She also teaches at Parsons, the New School for Design in New York City. Believe me, design is a 21st century concept. We finally figured it out.

Lauren comes to UW-Madison just as we begin a Year of Innovation on this campus. Her work is the definition of innovation, and with Radioactive, she stayed true to her unique vision, giving voice to an entirely new way to a story many of us thought we already knew. Lauren collected pieces from archives around the globe and traveled the world to talk to Marie and Pierre Curie's granddaughter and survivors
of the Hiroshima atomic bomb.

She created her own font for the book and made the illustrations using a technique that involved photographic imaging, because it was so important to the discovery of X-rays and radioactivity. In that sense, the ingenuity Lauren employed to bring her book to life makes her very much like the Curies. The work they were doing was so new, it didn't even have a name, until Marie Curie coined the term radioactivity. I think the enthusiasm we're seeing here on campus for Radioactive is due not only to its arresting combination of art and science, but also the deep sense of humanity found in the luminous pages.

Marie Curie's work influenced an entire century of global society, health, culture, politics, and history, but it came with a personal sacrifice. Radioactive portrays her spirit of innovation and drive to make discoveries in a way that is deeply moving and thought provoking. The book reminds us that one discovery always opens the door to another. Please join me in welcoming Lauren Redniss to the podium.

>> [Applause.]

Lauren Redniss: Thank you so much. Can you hear me? I can't really tell. I'm going to try putting this microphone in my pocket. So if it goes off, will you just let me know. Okay.

Thank you so much for coming. Thank you so much to the University, and to Chancellor Ward, and to Sarah McDaniel, and Sheila Stoeckel and everyone whose hard work has made this possible. I am so thrilled to be here and to have Radioactive to be chosen as the Go Big Read book for 2012.
I heard the theme was about innovation. As Chancellor Ward was saying, Marie and Pierre Curie, the subjects of this book that I’m here to talk about, were innovative in so many important ways. They had a marriage and professional collaboration in which they were both equal partners, long before that was the norm. They were imaginative in the work they pursued, seeking to understand invisible mysterious forces. They were innovative in methods that they developed in order to pursue that research, with new tools and new laboratory techniques.

The Curies made breakthroughs in the understanding of the atom, and those breakthroughs were a critical part of a series of discoveries that has led to the world as we know it today: a world in which we struggle with nuclear weapons proliferation, with the possibilities and the dangers of nuclear power, with the risk and benefit of radiation and nuclear medicine. So I gather that some of you have read the book. Is that correct? But maybe not everyone. Is that also correct? I don't know.

So I wanted to talk tonight about the book itself, and also about the story behind the story. So because this book is a bit unconventional, I'd like to first step back a little bit further and tell you about how I arrived at this form, how I began telling stories that combined research and reporting, artwork and design. So several years ago I began contributing these, what they call “op art” pieces, to the New York Times. They appear on the Op Ed page. That's why they're called “op art.” They combine oral history and on location drawing to look at issues in the news in hopefully unexpected ways.

For example, this is a piece I did just after 9/11. It was right before the U.S. invasion of Afghanistan. So the drawing you see here depicts a scene in Washington Square Park in New York City. Some of you may have visited Washington Square Park and noticed one area of the park, there is an area where people play chess, speed chess. I drew the encounter between these two men and interviewed them about chess, and they spoke about offense, defense, ideas about controlling the board.
So the conversation that I relay here is ostensibly about chess, but it doubles as a metaphor for what's going on in the larger world.

This is a piece that ran in early 2002. It depicts a meeting of the Finnegans Wake Society, which is a club that meets monthly in a book shop in New York City. And they dissect and decode Finnegans Wake, James Joyce’s famously impenetrable novel.

So at one meeting I attended, the discussion was really intense. People were deciphering the text from a Hungarian point of view. There was a botanist who was giving her perspective; there was a classic scholar who was offering that interpretation. After two hours, someone raises their hand and they're like, can we move on to the next word.

>> [Laughter]

Lauren Redniss: The conversation that's documented here is about that kind of exchange, searching for clues, trying to make meaning, putting a puzzle together. These were the words in the news at that time, talking about CIA, the FBI, Al Qaeda. I set this piece up as a kind of proxy to address those issues of the intelligence gathering failures leading up to 9/11.

Just to take one step further behind the story of this piece, I met the couple that ran the Finnegans Wake Society, who you see in the center there. Because, like all New Yorkers, I walk around a lot. In Soho, I used to pass by a tiny little lobby, and you could see into the window, like a lot of apartment buildings. Through that window you could see that floor-to-ceiling, the walls were covered with jigsaw puzzles, incredible jigsaw puzzles of every kind, a Hallmark style of adorable puppies and kittens, there was a Spiderman comic puzzle scaling the walls of Gotham, a reproduction of 16th central painting. It
was a very eclectic mix. I was curious about this place. One day, as I was walking by, there was a woman leaving the door and I stopped her and said, “Oh, do you live here?” She said yes. I said, “Do you know the story behind the puzzles?” She said “All of the puzzles have stories. I do not know them.”

>> [Laughter]

Lauren Redniss: So needless to say, I was intrigued. I went back the next day and rang the buzzer, and these two nice people showed me around, and there were puzzles all the way up the five stories of this building. It turned out that the jigsaw puzzles weren't the only brain teasers they were in; they also ran the Finnegans Wake Society.

This is a piece that tells the story of a unit of World War II camouflage painters. The surprising fact about this unit of camouflage painters was that it was composed almost entirely of gay men. So, at the time, homosexuality is illegal in every state of the United States, and you might imagine that the military would be a more hostile environment even than the non military. Surprisingly, in fact, in this unit, there was an attitude of complete openness. And I thought, this is really interesting. You know, within this space, where they're officially not welcome, in a unit whose official mission is all about secrets and subterfuge and concealment, in fact these men no longer had to pretend or invent false identities. So I was interested in portraying this layering of camouflage, and felt it was an interesting way to address some of the debates that were going on in the news in the recent Don't Ask Don't Tell law debates.

In 2005, I began a series of profiles of 100 year old people, for the Times. This is a woman, named Lilliette Counsel, who talked to me about the different generations of her family. Her father was a slave who worked on the Panama Canal, and the framed portrait you see are her mother and grandmother. In the drawing you also see a number of her bowling trophies. There's nothing about bowling in the text that ran in the Times, but to me that's the great thing about working with both words and images: you can influence information in the drawing without mentioning it in the text, and vice versa, so that each
element plays a unique role that is hopefully complementary and never redundant.

So if there's a common thread through these pieces, it's the search for new ways to tell stories. But as I worked on these pieces, I often felt that much of the juicy story behind the story details ended up getting left out in order to make the piece fit for a relatively limited black and white space in the newspaper, especially one that could change drastically at the last minute if, say, Exxon took out an ad on the Op Ed page—your piece is sliced in half. So I was really itching to tell a story in which—have a format in which I could keep in all these details, and I also really wanted to work in color. So I decided I needed to write a book.

This is my first book. It's called Century Girl” 100 Years in the Life of Doris Eaton Travis, Last Living Star of the Ziegfeld Follies. For this book, I decided to extend those biographical vignettes I had been doing for the New York Times into a biography, and it struck me a life of one centenarian could be a really interesting way to look at the 20th century, one person who lived this span of time, experiencing the twists and turns of history.

I met Doris Eaton Travis when she was 99 years old. When I started this book, my friends were saying "You're crazy. How can you build a project that relies on spending years of time with someone who's 99 years old?" And by the time I finished the book, Doris was 102, sharp as a tack, still performing on Broadway, and all my friends were like "Okay, she's going to outlive us all."

Here she is in the 1920s with her sister Mary. She is on the whatever this side is the left. She's on the left. And that's her sister, who is also a big Broadway star, on the right. So for more than a full century, Doris' life intersected in a pretty uncanny way with important historical moments and historical figures.
For instance, at 10 years old she was dancing for Woodrow Wilson, the President. He would wave to her from his box seats. This is just a couple of years later, here she is goofing around with Babe Ruth. She taught John Wayne how to rumba. By 14 years old, she was one of the famed Ziegfeld girls in Florence Ziegfeld’s Follies. I don't know how many of you are familiar with the Ziegfeld Follies. For those of you who aren't, they're Broadway spectacles that ran from about 1917 'til 1931. And Florence Ziegfeld was the producer and impresario, and he spared no expense. He didn't hesitate to have, as you see, live animals on stage, elephants, chimpanzees, horses. He used innovative theatrical effects, 3D effects. He created floors that every time the dancers put down a foot, the floors would spark.

After doing that for a little while, Doris need to move on. By 18 years old, she’s in Hollywood. And she was filming silent films. This is a silent film that she worked on in Egypt in 1922. Her costar is the grand nephew of the great poet Alfred Lord Tennyson. The thing that I loved about this moment in Doris' life is here she is, the likelihood of a girl from Norfolk, Virginia, ending up in Egypt in 1922 filming a movie at the same moment that Howard Carter, the British archeologist, is there in that very same spot, the Valley of the Kings, unearthing King Tut's tomb. And an unknown guy, 23 year old, named Alfred Hitchcock designed the intertitles for this film. For Doris, it's just like any other day.

She negotiated life among the mobsters, and all the ne’er do wells and moonshine dealers in New York City during Prohibition. Here she is, showing up on the front page of the newspaper, the day the stock market crashes in 1929. She survived the Great Depression. So Doris isn't a scientist or inventor; but I think the case can be made she was an innovator; she was a constant self-reinventer. After her show business career, she went on to raise racehorses, raised turkeys, she wrote a newspaper column, hosted a television program, she started college when she was 88 years old. So this is her college I.D. It took her 11 years to graduate, so she was done by the time she was 99. Any students here, you're way ahead of the game. Anyone with continuing ed aspirations, tons of time ahead of you.

Her 100th birthday coincided with the 100th anniversary of Times Square. She was invited there on New Year's Eve to set off one hundred rockets. That cake is life size. She's small, but the cake is still big.
This is the room of her house that she called the archive room, where she kept her papers, photographs, letters, diaries. You can see some of the types of things that were in this room, very precious things from some days I spent a lot of time in there, would open up a box and find a diamond ring, or maybe that baseball that Babe Ruth had given her, but also things of sentimental value. This box labeled Miscellaneous, Chickens and Bunnies. The value of memory is so personal, right?

When I said to Doris, I plan on writing a book about your life, she said that's very ambitious of you, honey.

>> [Laughter]

Lauren Redniss: Doris passed away in 2010, two weeks after performing on Broadway. She was 106 years old.

So every time I finish a project, I become aware of some element that that project didn't have, and it's that missing ingredient that inspires me to pursue whatever my next work will be. So upon completing Century Girl, which was a story about in many ways performances and spectacle, and it was printed on shiny paper, I wanted to go in the opposite direction. So I decided to tell a story about interior lives, and invisible forces.

Is it back on? Is that okay? Sorry. (Microphone malfunction.)
So the two invisible forces that animate the life of Marie and Pierre Curie, that I wanted to focus on, are radioactivity and love. So some of you have read the book, and for those of you who haven’t, I will give you a quick Cliffs Notes version. The book is all about the interplay between the text and the artwork. So because it’s the combination of the two that combine to convey the full meaning, I'm going to talk a little about the format of the book as I walk through some of the narrative here.

The first pages of Radioactive are in black and white. The chapters are titled to echo the ideas in Marie and Pierre Curie's early work. The first chapter is called “Symmetry” and the scientific work that Pierre Curie was doing at the time was studying the symmetries of crystals.

If you imagine like the gutter of the book down the center here, we always have the two characters on the facing pages, Pierre's always on the left, Marie is always on the right, and their stories unfold symmetrically. In many ways their experiences mirrored each other during their early years. This is a spread about their respective youths. Each experienced a teenage heart break, which all of us do, but it sounds more glamorous and dramatic when it happens on the 19th century on some wind swept field.

This is a page from the second chapter, which is called “Magnetism,” and again the subjects of their research were handing me these readymade metaphors. Pierre was studying relationship between heat and magnetism, and Marie the magnetic properties of steel. She's also living in this sixth floor walkup. In 1894, Marie and Pierre meet. They're introduced by a mutual friend, a Polish physicist. And here for the first time in the book, we see them in the same space but they're still on separate pages. And at the time Marie is working in the lab of the physicist Gabriel Litman. Gabriel Litman won the Nobel Prize for his innovation in color photography. Here for both thematic reasons, the initial spark of lover’s connection, as well as literal meanings, the connection to color and color photography here. This is when the first hint of color is introduced. I don’t know if it's evident from where you’re sitting, but some of the typography here is colored.
Finally, they meet on the same page. They fall in love, and the book turns to color. It's shamelessly corny, I know. Fast forward to the honeymoon, Marie and Pierre have two daughters, Eve and Irene, and they return to the lab. So working together, Marie and Pierre discover two new elements, radium and polonium, expanding the periodic table, and also make the groundbreaking insight that radioactivity is an atomic property—radioactivity, the word that Marie herself coined.

In 1903 they win the Nobel Prize. The Curies seem to be living out a fairytale. They have a beautiful family, share a great romance, do important and rewarding work. In 1906, tragedy strikes and Pierre is killed in a street accident, hit by a horse and carriage. And Marie is forced to continue their work alone, which she does, with great success, and isolates the highly ephemeral element polonium for which she is awarded an unprecedented second Nobel Prize.

Now she's not only the first woman to have ever won a Nobel Prize, but the first person to have won two Nobel Prizes in two fields, in physics and chemistry. She also falls in love again, this time with physicist Paul Langevin. Seems like another fabulous romance between two scientific giants, right? But there's a catch. Paul Langevin is married. An international scandal erupts, duels are fought, Marie flees Paris, traveling under a pseudonym.

Of course, the book doesn't only look at the Curies' lives and their romances, it also flashes forward in time to look at the modern day repercussions of some of their work.

So for this part of the book I did a lot of reporting. I traveled to Hiroshima, Japan. Until 1945, this building here was Hiroshima's Industrial Promotional Hall, now known as the atomic bomb dome. The buildings in the epicenter where the bomb hit were flattened, but this building survived with significant damage. So it's become an iconic monument in the city.
This is a photo is that ringing? It's okay?

So this is a photo this is the atomic bomb and this is the photo I took outside of my hotel in Hiroshima. While I was in Hiroshima, there were a number of weddings at this hotel. And each time the bride and groom would stand under this sweet little wedding canopy, and I was shocked at this uncanny resemblance between the atomic bomb dome and this lovely wedding canopy. And I was wondering, is that intentional, how did this happen?

And I think the similarity is likely unintentional, it's likely a pure coincidence; but nevertheless I think these kind of visual rhymes do tell us something. I think they tell us something about strangeness or the mysterious poetry about the world in which we live. I'd like to think that even if it isn't explicit like these photos don't end up in this book, but I like to think on some level, by going out and doing reporting, by making observations, that on some level that feeling, that kind of poetic mystery, seeps into the book.

I also interviewed survivors of the bombing. These are the documents of a survivor who told me that when the Americans dropped the bomb on Japan, he was exactly zero, meaning that his mother was pregnant. I interviewed this woman, Sadae Kasaoka. She was 13 in 1945. And so this is her story as it appears in the book. But besides simply relaying her words, I was struggling with, how am I going to portray this event, visually? How am I going to create some kind of imagery that doesn't caricature or trivialize such a horrific, historical moment?

I had a lot of bad ideas. I thought I was collecting rice paper as I was traveling, thinking I'll make a white on white collage that will somehow evoke the idea of the white flash that survivors talk about after a nuclear explosion. And then talking to Sadae, she showed me these cutouts made out of construction paper, and she held this silhouette of a man in her hands like this, and she just said “This is what my father looked like.”
And then she showed me this rectangular piece here, with the piece of black paper that folds back and underneath you see this brilliant red. And she said his skin peeled back to show the muscle underneath. I asked her, would it be all right with you if I reproduced these in my book, and she said yes. And I knew that there was nothing else I was going to do.

It's funny, there is a kind of cliché about writing, a kind of mantra that's repeated to aspiring writers, write what you know. I'm sure you've heard this. I think about that. I think it could be fine advice as long as it's not interpreted as, "Don't bother writing anything new, just write about whatever you happen to know already." So I think maybe another way that that advice could be interpreted is, "Go out, pursue what interests you, learn about it, be absorbed in it and immersed in it, and then come back and then write about what you now know." I'll get off my soapbox.

I also traveled to the Nevada test site outside of Las Vegas where the United States ran the atomic bomb testing program during the Cold War. I interviewed weapons specialists and mining engineers. These are spectators at one atomic bomb test in the Cold War. There are a lot of curious things that happened at the test site. For instance, they built a lot of structures that they would then monitor after an atomic bomb test. They built train tracks, a mock motel, they used to build little suburban houses and stock those houses with dummies, kind of perfect 1950's Leave It To Beaver families that were dressed in J. C. Penney clothes, and set off the bomb and come back later and see what the effects were.

I also visited a couple of nuclear power plants, including Three Mile Island, the site of the 1979 nuclear accident in Harrisburg, Pennsylvania. This is the eerily unguarded entrance to Three Mile Island. And some of the cooling towers. Just after "Radioactive" was published in March 2011, I'm sure you all remember that, Japan experienced the earthquake and tsunami that resulted in the accident at the Fukushima nuclear power plant, an unwelcome demonstration of how pressing these issues continue to be.
I interviewed cancer survivors. And this linked very directly with the Curies’ work. The Curies were innovative in the way that they applied their research directly to medical treatment. In 1900 Pierre Curie conducted an experiment, took a vial of radium, strapped it to his arm, left it there, when he removed an open wound that took a long time to heal. And he was thrilled.

His daughter wrote, “To his joy, a lesion appeared.” The reason he was thrilled was because the Curies realized that if these materials could destroy healthy tissue, they could also likely destroy diseased tissue. And that idea immediately they began applying to cancer treatment. And what you see here, which was at the time called “Curietherapy,” a very medieval torture device looking helmet embedded with kind of nodules of radioactive material to treat a tumor. And then a modern day treatment.

For a period of my research, I moved to Paris. This is a photo I took in Marie's lab, and you can visit that lab today. It's been preserved as a museum. You can see one of Marie's lab coats, and I think this represents approximately 50% of her wardrobe.

This is a photo of the Geiger counter that you can take and hold it up to the Curies’ papers, and hear the click, click, click of the radioactive materials, which are still active 100 years on.

So we've talked about the text, the Curie story, and some of the modern day implications. Now I want to talk with you a little bit about some of the visual aspects of the book. It's very important to me that the artwork and the design are created in such a way that they amplify the book's themes and the broader meaning. I wanted the book to be a complete object with every aspect carefully considered. There's nothing that's set on a default setting. So, for instance, one of the first things I did was design a typeface. And especially since the words of the text are all elements that show up, woven into the composition of the drawings, I wanted each letter to be considered with as much care as a line in a
So, for inspiration, I looked to the frontispieces of manuscripts in the New York Public Library collection, and was drawn to qualities I saw in examples like this, a stateliness and formality but also imperfection and an off kilter quality. I thought that tension gave the right tone to the book, a human touch, that I like the slight the imperfection was as important as this formality.

This is another example. And here are some characters from the font I designed. This is an early typeset page. As you can see, I hadn't figured out spacing, I have no punctuation and no numbers at that point. I made a few tweaks, and had a typeface.

So I named the font for this woman. Her name is Eusapia Palladina. She was the Italian spiritualist medium whose séances the Curies attended. The Curies were among a substantial number of intellectuals and even other Nobel Prize winners who were attending séances at this time. They seriously were considering the possibility of communication with the dead. And Pierre in particular, he treated a séance like any other lab experiment. I studied his notebooks, and at one instance he noted the weight of the medium before the séance, and then after, and apparently she gained six kilos.

So all this may sound foolish to us now, but I think there's something revealing here. And this is a moment in time in which electricity, the radio, the telegraph, x ray, all of these unseen forces were new technologies becoming part of everyday life. For many people, it didn't seem illogical that if some kind of invisible light could pass through human flesh and expose a skeleton, was it really that much more fantastical to imagine levitation or talking to a dead relative. That boundary between science and magic was blurry. What I think is interesting is that the Curies allowed themselves to consider the possibility of things they didn't understand and didn’t fully know about. I think it's that same attitude of openness, that same kind of intellectual adventurousness, that allowed them to make their great discoveries, the discoveries which we remember them for today for which they were awarded the Nobel Prize.
So I draw a lot. And I keep sketchbooks. And these are little repositories for basically anything that catches my eye. I want to show you a couple of miscellaneous examples. So I think I drew the guy on the left at a lecture. And the guy on the right at a dinner some time. And it's not even a good drawing. I think I just liked that it was drawn on this cheap placemat so it had that nice serrated edge so it ended up in the sketchbook. So I collect all kinds of clippings. I don't necessarily know if they're going to end up playing into published work later or not, but they go in the sketchbook. These are just some houses I thought looked cool.

This is another page, young Obama, Brigitte Bardot, some mysterious masked figure, and this great blonde hair blowing in the wind. This is another time I was interested in hairdos. These are some ancient Roman noblewomen. I drew these marble statues. I was just interested in this patterning that I saw in the hairdos. Finally, that idea made its way into my depiction of Marie Curie.

Here's another sketchbook page, lots of miscellaneous clippings, a little drawing of spectacles, and then a version of those little spectacles end up on a page in the book about fallout shelters.

This is a Greek vase. I really like the horses on this Greek vase. It gave me an idea. And I interpreted the vases' depiction of the many horses pulling a chariot as one horse in motion rearing up his legs.

So I'm not trained as a scientist. And the learning curve for me working on a book like this is pretty steep, in some very limited way the artwork is a bit of a science experiment itself. And I chose to create the artwork in this book in a medium called Cyanotype printing, a camera-less photographic technique. There are a lot of different ways people do this, or slight variations on a same basic theme.
What I do is, I mix chemicals, coat with paper, let the paper dry in a dark room, and then get a negative of my drawings, place that negative onto the chemically treated paper, put that into the basically take it outside in the sunlight and the ultraviolet rays of the sun interact with the chemicals on the coated paper, and that turns the paper a deep shade of blue.

So there are two main reasons for this choice of medium. That first reason was thematic. To me it made sense to use a medium that was based on the idea of penetrating rays in a book about radioactivity. The second reason was aesthetic. The visual effect of Cyanotype gives this sort of moody, twilight quality. The white lines against the blue background, I thought that captured what Marie Curie called radium spontaneous luminosity, a kind of internal glow.

Cyanotypes also have a great back story. In the 17th century, a child named Johann Conrad Dippel was born in Castle Frankenstein. This is a drawing, and this is a film still from Mel Brooks’ Young Frankenstein. But I’m not making this story up. Dippel was an alchemist and wanted to create a universal remedy, an elixir of life. He brewed up all kinds of unsavory things, animal skins, horns, you name it. And put this into a paste that he called Dippel’s Oil.

Meantime, Dippel shared his lab with a dye maker. One day the dye maker was trying to make a red dye and ran out of his principle ingredient. He reaches into the cabinet, and he grabs some Dippel’s Oil, stirs it up, and instead of the scarlet dye he was hoping for, he gets this deep blue. And it was really vivid, light fast, and became instantly popular. The Prussian Army took it up and began dying their uniforms with this color, and that is the same formula we use today for Cyanotype printing.

This is the cover of the first book that was made entirely of Cyanotype. It was made by a woman named Anna Atkins in Great Britain in 1849. You can see, it’s all about British algae. You may not be familiar
with the wonders of British algae, but I recommend taking out this book. It's really, really beautiful.

I'd like to take you through the making of one print from Radioactive. This is one completed spread from the book. The image depicts a scene from 1911, the royal banquet just after Marie Curie has won her second Nobel Prize. She is dining here with King Gustav V of Sweden. If we deconstruct this image, we start with a series of sketches. This is a still life I drew on my kitchen table, some pears and radishes. These are musicians at a jazz club downtown one Sunday. Another sketchbook page, from a faculty meeting where I teach at Parsons.

These are actually some of the dummies from the nuclear test site. That's 1950s figures. So remember those feet. This is a painting that I drew at a show at the Guggenheim museum, a show of Spanish paintings. Finally, just some archival material. And what I redrew was platonic solids on some really tiny playing-cards from the 15th century, and that up there is an etching 18th century German etching of a fountain, and I redrew that figure on top. You can see the figure from the fountain ends up as a waiter, a couple times at the banquet. You can see the radishes, the feet down here of the Nevada test site dummy, my colleague at Parsons ends up as the king, et cetera. So basically I take all of those sketches, I use a Xerox machine, I cut them up and I recombine them into one composition that gives them a new context.

And then I take that drawing, and I transform it into the equivalent of a photographic negative. I place it onto transparent paper. You can see there's a lot of Scotch tape involved in the process. It's highly refined. And then I take that negative, I place it on a chemically coated paper, put it out in the sun, and voila, the blue image.

A lot of times, I go in and hand color the images. And then finally I add the text.
So we've looked at the two narrative threads in the book, one unfolding in the text and one in the images, and we've looked at the typeface. Of course, the whole point is the union of all of these elements. So in other words, the design of the artwork on the page, and the physical presence of the text is all part of how a reader interprets meaning.

For instance, in this page about Marie falling in love with Paul Langevin, the text is laid out to convey that feeling of ecstasy in the lovers exchange. And here, with this vial of radium, the text functions as a drawn element, evoking the glow of light from the tube. Sometimes the most powerful thing to do with text is not to have any at all.

So to put all of these strands together, the written narrative of the shifts in time between the Curies story and the present day, the design, the artwork, I want to read you one short passage from the actual pages of the book. If you've already read this, I hope the past few minutes will shed new light on it. So the passage I'm going to read comes about a third of the way through Radioactive.

It's 1906, Marie and Pierre have been married for 11 years. They've won the Nobel Prize. They have two daughters and they live in Paris. Their health is beginning to show the effects of the radiation exposure, which they try to ignore. It's spring, and the family has gone to the countryside. So this passage, like many in the book, does shift in time between the past and the present, linking the Curie story to more recent events.

So it begins with an excerpt from Marie's diary in which she's directly addressing Pierre. This is Marie. “We collected flowering chestnut branches and gathered a huge bouquet of water buttercups that you love so. We slept nuzzled against each other as always. The next day you were weary. The weather was divine. Irene chased butterflies with a mean little net. I took off her jumper in the middle of the prairie and she ran in her little blue knit trousers, arms and neck naked, to the house. I sat down against you and lay across your body. I had a little clenching in my heart, holding you there, but I felt happy. I
had the feeling that I had frequently felt during this recent time, that nothing troubled us.”

That following day, Pierre returned to Paris for a meeting at the Hotel des Societes Savants de Science. It was raining that Thursday when he left after lunch, preoccupied by work and limping from chronic pain. As he crossed the busy intersection of the Rue Dauphine in the gloom and the snarl of traffic, he was struck by a horse and driver crossing the Pont-Neuf. His daughter Eve later described the moment. “His body passed between the feet of the horses without even being touched and then between the two front wheels of the wagon. A miracle was possible. But the enormous mass, dragged on by its weight of six tons, continued for several yards more. The left back wheel encountered a feeble obstacle, which it crushed in passing, a forehead, a human head. The cranium was shattered, and a red viscous matter trickled in all directions in the mud. The brain of Pierre Curie.”

Pierre's original schedule would have sent him at a second meeting two streets away. However, a strike shuttered that building and diverted his route. The rain made for poor visibility and slippery roads. The carriage was carrying some 13,000 pounds of military gear, making it difficult to stop suddenly or reverse course. For a disaster created by multiple unanticipated failures in a system, a collection of small simultaneous mishaps that lead to one massive catastrophe, sociologist Charles Perrow coined the term “normal accident.”

This is a quote from Perrow: “We start with a plant, airplane, ship, biology laboratory, or other setting with a lot of components. Then we need two or more failures among components that interact in some unexpected way. Each of the failures, design, equipment, operators, procedure or environment, is trivial by itself. The failures become serious when they interact.”

Such, Perrow contends, was the case in March 27, 1979, when three of the two reactors at Three Mile Island descended into partial meltdown. An orchestra of leaky valves, concealed indicators, overflowing water tanks, contradictory emergency signals, and operator confusion, created a disaster that began and
was compounded in a matter of seconds yet took days to unfold, understand and stop.

Mary Osborne, a local resident, can see the Three Mile Island plant from her bedroom window. Some days, she could smell chocolate from the Hershey factory 14 blocks away. Some days, the aroma of yeasty bread from nearby Capital Bakers floats her way. On that Wednesday morning in 1979, she remembers, the air filled instead with a sharp metallic taste. Since the accident, Mary Osborn has collected mutant plants from the area, which she photographs, dries and preserves. Her collection includes this pink rose. It has two complete sets of leaves and petals but no reproductive parts. It is sterile.

Marie returned home to learn her husband was dead. The flowers he had picked in the country were still fresh on the table. His covered gray watch still ticked away the time.

So when I finished Radioactive, even though to a real scientist, learning what I had to learn would have been nothing, to me it felt the nuclear physics equivalent of trying to climb Everest. Kiddingly, I said to a friend, ”That's it. My next book will be about clouds and rainbows.” Then I started thinking, clouds and rainbows, really interesting. Really, really beautiful. And so that's what I'm working on now.

>> [Laughter]

Lauren Redniss: It's a book about weather, including clouds and rainbows, and I hope you all stay tuned. Thank you so much.
Chancellor Ward: Well, we now can have a few questions but I know that might take time so we have a few questions that I have here, that I will ask. First, and then we will throw it open to the audience. The book is one about the history of science, which is appealing because the feeling the book gives us is one that seems far from rational and scientific, although these are expressly topics of the work. Radioactive is a haunting book, from its stories of unexpected aftereffects of radiation to the practice of generating its pages to the eerie glow that covers the give off in a dark room after extended exposure to light. Did you feel haunted or a sense of otherworldly, as you were writing it?

Lauren Redniss: Wow. Gosh. I don't know if I felt haunted.

Chancellor Ward: Or otherworldly, or neither.

Lauren Redniss: I guess on the best days, when you're creating artwork, you don't feel like you're in total control. And that's a great feeling. That something better than what you can consciously achieve is happening. So if that in those moments, I suppose there is something transcendent.

Chancellor Ward: Right. That's better. Let me ask one more, and then we'll see if we can have some from the audience. The excerpt in the book about the Merry Widow Health Mine was very intriguing. In your research, did you uncover any other instances or facts that support the idea that small amounts of
radiation can have health benefits?

Lauren Redniss: Well I guess the largest example of that is radiation treatment for cancer. So that's maybe not small. Huge.

Chancellor Ward: So as a matter of proportion and you show both.

Lauren Redniss: And control, yeah.

Chancellor Ward: Are there any questions from the audience at this time? There's a microphone right here.

Audience Member: (Off Microphone.) he was wondering how you came up with the idea to make glow in the dark cover.

Lauren Redniss: I don't remember exactly the first moment of having that idea. It just it just seemed fun and possible, so why not. And the great thing about glow in the dark inks these days is that there are these inks that are transparent. So it's not evident. You know it doesn't change the color. But then at night, it has this magical effect. What I was happy about was it was pretty much not mentioned in any of the early publicity about the book, so people were surprised and continue to be surprised by that. So that's been really fun.
Actually had a friend call me up and say, did you know your book...it was an email, he said, “Did you know your book glows in the dark?” Just kiddingly, because I thought it was clear. I wrote back, “I have no idea what you’re talking about.”

>> [Laughter]

Lauren Redniss: And so he actually went out and bought a second copy of the book to prove

>> [Laughter]

Chancellor Ward: So it’s a sales technique.

Lauren Redniss: I didn’t mean for it to be!

Chancellor Ward: Any other questions? Please. Come forward if you have a question.
Audience Member: Found it interesting when things went bad for Marie Curie that was a lot of anti-Semitism that seemed to rise up around her. I wondered how you regarded that, and I just felt it was a very interesting part of the history, what was going on, but not one that I was very familiar with.

Lauren Redniss: Right. I think the combination of just simple xenophobia and also the fact that she was Polish, somehow, you know, combined to generate this anti-Semitism, particularly in the wake of that scandal. I think people were it was a period a tumultuous period in terms of, you know, women's rights, and, you know, just exactly, right, that he was referenced many times in the anti-Semitic attacks. And, yeah. So exactly. It's kind of convergence of all of these different forces aimed at “threatening woman” somehow.

Audience Member: Did she feel self consciously Polish the entire time she was in France?

Lauren Redniss: She may not have put it as self conscious because she was so proud. It was hard for her to leave Poland and she always felt intense connection and dedication to her country. That's why she named the first element she discovered polonium.

Audience Member: Hi. I wonder about your painting style. I want to know why you choose this to paint like this. This looks all the pictures in your book looks pretty native, like Africa. But I believe somebody like you, who started design, must have must kept print so I want to know why you choose this why you choose this style to paint all your books and pictures.

Lauren Redniss: It's funny. I guess I don't necessarily feel like I choose this style. I just draw, and I try to draw in as simple and direct a way as I can to convey the ideas I'm interested in. And if it seems to work,
I go with it.

Audience Member: So when you paint you don't think of the shadow, the value, and the contour?

Lauren Redniss: It depends. I think, you know I don't know. Sometimes I do. Sometimes I may not. Thank you.

Audience Member: You talked a little bit about the difficulty of approaching the large amount of science sort of embedded in the history of this book. And one of the things that struck me about the book was sort of how short it was, and how sort of subliminal some of the science was. On page 7 you have four atom diagrams of polonium and those have incredible significance in the history of the development of atomic theory, spectroscopy and early quantum mechanics. And as you alluded to, there are things in the pictures that are not reflected in the text. That makes this in some ways a difficult book to approach, unless you've got a large army of people to comment on the kind of interesting background of the things that the book kind of draws out.

Can you talk a little bit about how you chose the length of the book, and how much of that sort of subtle science content was intentional versus how much of it just sort of struck your fancy?

Lauren Redniss: I mean I try to reach a balance between conveying the essential information, and having a dynamic story. So, you know, it's largely intuitive, those choices, I think, even though they're very much thought about and considered. But I wouldn't say that there's like a precise kind of number or proportion that I put on any of that.
Audience Member: When you were developing your layouts, did you tend to begin with the imagery and then write the text to fit or did you alternate? How did you go about it?

Lauren Redniss: I worked on both of them at the same time. So I constructed a dummy book, like a hand made sewn exact number of pages, and worked on the manuscript like any other kind of Word document, and paste in the sketches as I do them. Xerox versions of them with Scotch tape into that dummy book, print out my Word manuscript, and then Scotch tape the paragraph of text onto that page, move it to the next page if it didn’t seem to work—so it’s a very physical process.

Audience Member: I was just curious if there was anything in particular that triggered the idea of including the modern effects of their research. Obviously the atomic bomb was there anything, while you were in your process of researching the book that triggered that idea?

Lauren Redniss: I think that was essential concern for me from the moment I began the project. It was one of the main reasons that I wanted to write about the Curies, was because of those modern day implications. I wanted to write something that was a love story, that did have this human, you know, narrative behind it, but that very much had pressing relevance. That was the central reason.

Audience Member: I'm a creative writing major here at the University and I was actually mostly curious about the publishing process of the book because I haven't heard you talk much about that. I was curious if you had a difficult time finding a publisher for the book because it's such a difficult book to categorize, and because it's obviously, just from a financial standpoint, it's obviously not an inexpensive book to print, because it's so beautifully colored and there's so much art. I was wondering what that process was like.
Lauren Redniss: So, yeah. My first book, I pitched. I made a dummy book, and I had a agent. She brought it around to all the New York publishers. every single one of which said no. And then I was having Indian food, sitting on my friend’s living room floor one night, and a friend of his who’s a publisher, was there, and she was like “What are you up to?” I told her, “Well, I’m working on this project.” She was like “Great, let’s do it.”

>> [Laughter]

Lauren Redniss: It doesn’t work like that, right? So of course she gave me her card and of course I thought nothing will come from this. But she had her own imprint at Harper Collins and she published my book. And so when that first book was done, I knew she was going to ask me what my next idea was. So I had my little pitch in my mind. One night we were on our way to dinner and we were in the back of the cab. She said “What are you thinking about?” I was like, blah blah blah, and she was like “Great!” And then she lost her imprint, that fell apart, but Harper Collins retained me. I never had an agent for either of those two projects because that agent didn’t work out. So it was really fluke-y, I guess is the answer.

Audience Member: Hi. So my question was during your talk, you've used humor quite a lot to liven the material. But the book itself felt very serious. I wondered if that was a reflection of the Curies themselves or the topic matter or something else altogether.

Lauren Redniss: I guess both. I hope there’s a little humor in the book. But, yeah, I mean yeah, I guess Marie Curie does seem very serious to me. Although I think she had fun. But I don’t know. I mean I guess yeah. I didn’t set out to be either serious or funny or anything. I just tried to deliver the material in as kind of honest and natural a way as seemed right, I guess.
Audience Member: Lauren, we’re over here on your left. So given that you have more training in the arts, I’m wondering I’m curious, what helped you the most when in like understanding and learning the science so that you could reconvey it in the book? Because obviously you’re conveying something of very large scientific magnitude.

Lauren Redniss: Yeah. That's a great question. I read a zillion books and I did my best to struggle through them and really just try to understand the material, and not, you know, not just repeat what I was reading, but to try to actually get to an understanding. But the probably more direct answer to your question is, after I wrote the book, I sat down with a friend of mine who is a historian of science, and we went through line by line all of the scientific passages, and he would say, “Well, you could say it this way or something.” And then I would have a counterproposal to what he suggested to me. Because his suggestion to me may have been correct but it may not have felt poetic or may not have felt like the words were wrong. So it was kind of a back and forth, in which I felt like I actually had to kind of grapple with the material in detail, yeah. But it was fact checked. So I felt... (laughs)

So anyone else?

Audience Member: (Off Microphone.) Do you prefer to be considered the author or the artist of the book? What’s the difference? Or are you both?

Lauren Redniss: I guess you could say both, or either. I would be totally happy with either. Yeah. I don’t know. I mean I guess I don’t know. I talk to my students a lot about authorship, you know, that they are generating their own ideas. Because I guess that’s sort of in response to the idea of illustration, and people thinking that an illustrator just kind of draws the text, and one thing I know is that’s not what I want to be. But between artist and author, I’m very happy with either, both, combination, great.
Speaker: We have time for one more.

Audience Member: This may be a good last question. I'm wondering about you and your life, and how your experience in writing this book and its success has changed your life.

Lauren Redniss: Well, it's been amazing. I feel so lucky and astonished and thrilled. And I feel so privileged that you guys would read my book and care about it. It's a tremendous honor. So that gives me a lot of happiness. And I feel thrilled that I can just continue working, you know. That's, I think, the biggest thing, is to be able to move forward, and learn new things, and be able to create new work. And that's what I, you know, kind of where I want to be. I feel very privileged to be able to do that. Thank you.

Chancellor Ward: Thank you.

>> [Applause.]

Chancellor Ward: As always, great event. Thank you for being with us tonight.